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EXAMINER	
NGUYEN, ALLEN H	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/632,883	QUINTANA ET AL.	
	Examiner	Art Unit	
	Allen H. Nguyen	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 July 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *07/31/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 07/31/03 has been considered by the examiner.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claim 23 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Regarding claim 23 is drawn to functional descriptive material embodied on a computer readable medium (i.e., "data structures and computer programs which impart functionality when employed as a computer component" at MPEP 2106.IV.B(1)). However, the program/algorithm itself merely manipulates data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application in the technological arts. MPEP 2106.IV.B.2(a) (Statutory Product Claims) states:

> "A claim limited to a ... manufacture, which has a practical application in the technological arts, is statutory."

In order for a claimed invention to accomplish a practical application, it must produce a "useful, concrete and tangible result" *State Street,* 149 F.3d at 1373, 47 USPQ2d at 1601-02 (see MPEP 2106.II.A). Currently, the claim does not recite a practical application. In order to for the claimed product to produce a "useful, concrete and tangible" result, recitation of one or more of the following elements is suggested:

- The manipulation of data that represents a physical object or activity transformed from outside the computer (MPEP 2106 IVB2(b)(i)).
- A physical transformations outside the computer, for example in the form of pre or post computer processing activity (MPEP 2106 IVB2(b)(i)).
- A direct recitation of a practical application in the technological arts (MPEP 2106 IVB2(b)(ii)).

Claim Objections

Claims 4, 15, 17 are objected to because applicant discussed to perform additional compressing the print data (Specification, page 6, lines 5-15). But it does not describe in the specification that the print data are already compressed. Applicant is required to amend the claims to reflect what is disclosed in the specification.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-2, 8, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Heydinger (US 6,124,940).

Regarding claim 1, Heydinger '940 discloses a method of transferring data from a controller to an output device, comprising:

providing input data that describes a firing pattern for an array of ink nozzles (image data contained within the host computer corresponding to locations at which ink droplets are to be jetted onto the print medium, col. 3, lines 43-45, fig. 4), the input data having a first portion and a second portion (i.e., the host computer is used to define locations of non-absolute zero values/first portion in the image data and to define locations of absolute zero values/second portion in the image data; see col. 4, lines 4-6), the first portion being disposed in a first pattern (Pass 1, fig. 7) and the second portion being disposed in a second pattern (Pass 2, fig. 8) that is at least substantially complementary to the first pattern (i.e., the locations of the absolute zero values and the locations of the non-absolute zero values are mutually exclusive from each other; see col. 2, lines 49-51);

removing the second portion of the input data so that the input data is compressed (i.e., an absolute value of zero for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63);

sending intermediate data corresponding to the compressed input data to the output device (i.e., only the image data having non-absolute zero values is transmitted from the host computer to the printer; see col. 2, lines 54-56);

wherein the output device expands the intermediate data at the output device based on at least one of the first and second patterns (i.e., the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 66-67).

Regarding claim 2, Heydinger '940 discloses the method, wherein providing includes selecting the first portion (the image data represents at least a portion of a print image to be printed by the printer, col. 3, lines 62-63), and wherein selecting (the non-absolute zero value image data corresponds to image data which has the potential to be printed during a particular pass of the printhead, col. 4, lines 9-11), removing (i.e., an absolute value of zero for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63), and sending (i.e., only the image data having non-absolute zero values is transmitted from the host computer to the printer; see col. 2, lines 54-56) are conducted a plurality of times to resolve the input data into a plurality of different portions configured to specify interlaced patterns of an output (i.e., dividing image data into at least two subsets of non-absolute zero image data, at least two subsets of non-absolute zero image data being at least partially interspersed with each other in image matrix of bits; see col. 6, lines 33-37).

Regarding claim 8, Heydinger '940 discloses the method, wherein sending the intermediate data includes sending the compressed input data without modification to the output device (i.e., only the image data having non-absolute zero values is transmitted from the host computer to the printer; see col. 2, lines 54-56).

Regarding claim 23, claim 23 recites identical features, as claim 1, except claim 23 merely deals with executing the method of claim 1 on a computer. Thus, arguments made for claim 1 are applicable for claim 23.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 4, 9, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heydinger (US 6,124,940) in view of Hiraide et al. (US 7,178,078).

Regarding claim 4, Heydinger '940 discloses the method, wherein the compressed input data (the non-absolute zero value image data corresponds to image data, col. 4, lines 9-10) includes a set of data elements having associated values (i.e., the actual values of bits 2, 4, 6 and 8 are substituted for the "X" bits shown in slice 1 in

fig. 2), the set having a size corresponding to a total number of the data elements in the set (the four bits of data corresponding to slice 2 in fig. 7 are expanded out to the eight bits of data corresponding to slice 2 in fig. 2, col. 5, lines 3-5),

the method further comprising producing the intermediate data from the compressed input data by at least one of changing the size of the set (a second pass of the printhead, col. 5, line 11, fig. 8), transforming one or more of the associated values (the four bits of data labeled slice 1 and slice 2 correspond to the eight bits of data labeled slice 1 and slice 2 in fig. 2; col. 5, lines 13-15),

Heydinger '940 does not show further compressing the compressed input data.

However, the above-mentioned claimed limitation is well known in the art as evidenced by Hiraide '078. In particular, Hiraide '078 teaches further compressing the compressed input data (The MISR 7 further compress compressed data from the space compactor 6, col. 9, lines 18-20, fig. 3).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Hiraide '078, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Hiraide '078, since Hiraide '078 stated in col. 1, lines 59-61 that such a modification would ensure a compressing method called dynamic compaction is generally used in order to decrease a quantity of test data.

Regarding claim 9, Heydinger '940 discloses the method, wherein the output device is a printing device (printer, fig. 1), and wherein providing (image data contained within the host computer corresponding to locations at which ink droplets are to be jetted onto the print medium, col. 3, lines 43-45, fig. 4), removing (i.e., an absolute value of zero for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63), and sending (i.e., only the image data having non-absolute zero values is transmitted from the host computer to the printer; see col. 2, lines 54-56) are conducted.

Heydinger '940 does not show conducting by a controller that is separate from the printing device.

However, the above-mentioned claimed limitation is well known in the art as evidenced by Hirano '791. In particular, Hirano '791 teaches conducting by a controller that is separate from the printing device (i.e., as a program for printer control, and may then be installed in a computer; col. 12, lines 1-2, fig. 20, controller 104).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Hirano '791, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Hirano '791, since Hirano '791 stated in col. 1, lines 17-19 that such a modification would ensure a computer readable recording medium storing a software program, and mask data, thereof.

Regarding claim 15, Heydinger '940 discloses The method of claim 10, wherein the data elements of the invalid portion are present a number of times and have associated values, the method further comprising producing the intermediate data by at least one of changing the number, changing at least a subset of the associated values, and further compressing the compressed print data.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heydinger (US 6,124,940) in view of Otsuki (US 2003/0025751).

Regarding claim 5, Heydinger '940 discloses the method, wherein the output device (printer, fig. 1) expands the intermediate data (the four bits of data corresponding to slice 2 in fig. 7 are expanded out to the eight bits of data corresponding to slice 2 in fig. 2, col. 5, lines 3-5).

Heydinger '940 does not show that the intermediate data is disposed in a third pattern, the third pattern being related to but different from the first pattern.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Otsuki '751. In particular, Otsuki '751 teaches the intermediate data is disposed in a third pattern (the third mask pattern is selected, page 4, paragraph [0061], fig. 10E), the third pattern being related to but different from the first pattern (figs. 6B, 6D).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Otsuki '751, it would have been obvious to one having

ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Otsuki '751, since Otsuki '751 stated on page 1, paragraph [0006] that such a modification would improve image quality while minimizing the reduction in printing speed.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heydinger (US 6,124,940) in view of Rademacher (US 5,930,466).

Regarding claim 6, Heydinger '940 discloses the method, wherein removing provides a first compression of the input data (i.e., an absolute value of zero for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63),

Heydinger '940 does not show, the method further comprising performing a second compression of the input data before sending.

However, the above-mentioned claimed limitation is well known in the art as evidenced by Rademacher (US 5,930,466). In particular, Rademacher '466 teaches, the method further comprising performing a second compression of the input data before sending (more than one data compression technique is performed in real time for each individual slice being compressed, col. 5, lines 53-55).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Rademacher '466, it would have been obvious to one

having ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Rademacher '466, since Rademacher '466 stated col. 1, lines 12-15 that such a modification would ensure a host computer compresses each slice of the original bitmap print data according to at least two different compression techniques to see which has the greater compression ratio for each individual slice.

11. Claims 10-14, 16, 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosen et al. (US 6,543,871) in view of Heydinger (US 6,124,940).

Regarding claim 10, Rosen '871 discloses a method of transferring data for printing, comprising:

providing print data at a controller (122, fig. 1), the print data having a plurality of data elements specifying positions for colorant placement onto print media (i.e., any other type of device which creates images or text by incremental deposition of dots of colorant on a recording medium; col. 12, lines 23-25) by a printing device (printer 130, fig. 1);

applying a mask (in any suitable form capable of being received and processed by mask generator 120, col. 3, lines 50-52, fig. 1);

Rosen '871 does not show the print data to specify an invalid portion of the data elements;

removing the specified invalid portion of the data elements from the print data to compress the print data;

sending intermediate data corresponding to the compressed print data to the printing device from the controller;

wherein the printing device expands the intermediate data based on the mask;

wherein the printing device prints at least a subset of the expanded intermediate data.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the print data to specify an invalid portion of the data elements (i.e., both the host computer and the printer are instructed of the locations of the absolute zero values/invalid portion data elements in the image data; col. 2, lines 52-54);

removing the specified invalid portion of the data elements from the print data to compress the print data (i.e., an absolute value of zero/invalid portion data elements for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63);

sending intermediate data corresponding to the compressed print data to the printing device from the controller (i.e., only the image data having non-absolute zero values/valid portion is transmitted from the host computer to the printer; see col. 2, lines 54-56);

wherein the printing device expands the intermediate data based on the mask (i.e., the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 66-67);

wherein the printing device prints at least a subset of the expanded intermediate data (i.e., only the image data having non-absolute zero values/valid portion is transmitted from the host computer to the printer; see col. 2, lines 54-56, figs. 7-8).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

Regarding claim 11, Rosen '871 discloses the method, wherein the printing device has a printhead with an array of nozzles (Firing of individual nozzles of pens to spread use evenly, col. 4, line 49), wherein applying the mask (120, fig. 1).

Rosen '871 does not show the method, further specifies a remaining valid portion that defines a firing arrangement for a subset of the nozzles, and wherein the printing device prints the subset of the expanded intermediate data by ejecting ink droplets from the array of nozzles onto the print media according to the firing arrangement.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches further specifies a

remaining valid portion (the first of said two subsets containing non-absolute zero values, col. 5, lines 64-65) that defines a firing arrangement for a subset of the nozzles (define locations of non-absolute zero values in the image data, col. 4, lines 5-6), and wherein the printing device prints the subset of the expanded intermediate data (transmitting only said first subset of said image data containing said non-absolute zero values from the host computer to the printer, col. 6, lines 1-3) by ejecting ink droplets from the array of nozzles onto the print media according to the firing arrangement (locations at which ink droplets are to be jetted onto the print medium, col. 3, line 45).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

Regarding claim 12, Rosen '871 does not disclose the method, wherein the data elements of the print data have values, the method further comprising changing the values of at least a subset of the valid portion before sending.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches, wherein the data elements of the print data have values (the host computer is used to define locations of non-absolute zero values/first subset and absolute zero values/second subset in the

image data, col. 4, lines 3-6), the method further comprising changing the values of at least a subset of the valid portion before sending (the non-absolute zero value image data corresponds to image data which has the potential to be printed during a particular pass of the printhead, col. 4, lines 9-11).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

Regarding claim 13, Rosen '871 does not disclose the method, wherein applying, removing, and sending are conducted a number of times on the print data to produce a corresponding number of interlaced patterns of printed output.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the method, wherein applying (define locations of absolute zero values/invalid portion in the image data and to define locations of non-absolute zero values/valid portion in the image data, col. 4, lines 3-6), removing (i.e., an absolute value of zero/invalid portion for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63), and sending (i.e., only the image data having non-absolute zero values is

transmitted from the host computer to the printer; see col. 2, lines 54-56) are conducted a number of times on the print data to produce a corresponding number of interlaced patterns of printed output (i.e., dividing image data into at least two subsets of non-absolute zero image data, at least two subsets of non-absolute zero image data being at least partially interspersed with each other in image matrix of bits; col. 6, lines 33-37).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

Regarding claim 14, Rosen '871 discloses the method, wherein the printing device is configured based on the mask (in any suitable form capable of being received and processed by mask generator 120, col. 3, lines 50-52, fig. 1).

Rosen '871 does not disclose the method, wherein the printing device is configured to expand the intermediate data by inserting invalid data elements into the intermediate data.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the method, wherein the printing device is configured to expand the intermediate data by inserting invalid data elements into the intermediate data based on the mask (i.e., using the

information contained within the command byte and bits 2, 4, 6 and 8, the printer inserts zeros corresponding to the absolute zero values/invalid portion in the image data to be printed by the printer. Thus, bits 2, 4, 6 and 8 are used by the printer and expanded out by inserting zero values at bits 1, 3, 5 and 7 such that the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 60-67).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

Regarding claim 16, Rosen '871 discloses the method, the pattern being defined by the mask (in any suitable form capable of being received and processed by mask generator 120, col. 3, lines 50-52, fig. 1).

Rosen '871 does not show the method, wherein the printing device expands the intermediate data by disposing the intermediate data in a pattern.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the method, wherein the printing device expands the intermediate data by disposing the intermediate data in a pattern (i.e., the four bits of data corresponding to slice 1 in fig. 7 are

expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 66-67).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

Regarding claim 18, Rosen '871 discloses a system (100, fig. 1) for transferring print data to a printing device, comprising:

a controller (122, fig. 1) configured.

Rosen '871 does not show a system for transferring print data to a printing device, comprising: selecting a first portion of print data disposed in a first pattern and to remove a second portion of the print data disposed in a second pattern that is complementary to the first pattern so that the print data is compressed;

a printing device configured to receive intermediate data corresponding to the compressed print data and to expand the intermediate data based on at least one of the first and second patterns, the printing device being configured further to print at least a subset of the expanded intermediate data.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches selecting a first

portion of print data disposed in a first pattern (the host computer is used to define locations of absolute zero values/second portion and to define locations of non-absolute zero values/first portion in the image data, col. 4, lines 3-6) and to remove a second portion of the print data disposed in a second pattern that is complementary to the first pattern so that the print data is compressed (i.e., an absolute value of zero/second portion for a particular scan of the print-head is not transferred from the host computer to the printer, thereby decreasing/compressing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63);

a printing device configured to receive intermediate data corresponding to the compressed print data (only the image data having non-absolute zero values/first portion is transmitted from the host computer to the printer, col. 2, lines 54-56) and to expand the intermediate data based on at least one of the first and second patterns (i.e., the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 66-67), the printing device being configured further to print at least a subset of the expanded intermediate data (Using the information contained within the command byte and bits 2, 4, 6 and 8, the printer inserts zeros corresponding to the absolute zero values in the image data to be printed by the printer, col. 4, lines 60-64).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-

12 that such a modification would ensure a method of transferring image data from a host computer to.such a printer.

Regarding claim 19, Rosen '871 discloses the system, wherein the printing device is an ink-jet printing device (inkjet printers, col. 5, line 45).

Regarding claim 20, Rosen '871 does not disclose the system, wherein the printing device is configured to expand the intermediate data by inserting data elements into the intermediate data based on the second pattern.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the system, wherein the printing device is configured to expand the intermediate data by inserting data elements into the intermediate data based on the second pattern (i.e., bits 2, 4, 6 and 8 are used by the printer and expanded out by inserting zero values at bits 1, 3, 5 and 7 such that the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 64-67).

In view of the above, having the system of Rosen '871 and then given the well-established teaching of Heydinger '940, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Rosen '871 as taught by Heydinger '940, since Hendinger '940 stated in col. 1, lines 10-12 that such a modification would ensure a method of transferring image data from a host computer to such a printer.

12. Claims 15, 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rosen et al. (US 6,543,871) in view of Heydinger (US 6,124,940), and further in view of Hiraide et al. (US 7,178,078).

Regarding claim 15, Rosen '871 does not disclose the method, wherein the data elements of the invalid portion are present a number of times and have associated values, the method further comprising producing the intermediate data by at least one of changing the number, changing at least a subset of the associated values, and further compressing the compressed print data.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the method, wherein the data elements of the invalid portion are present a number of times and have associated values (i.e., the command byte may include a plurality of bits indicating that the **absolute zero/invalid portion** value data during **a first pass** of the printhead corresponds to the odd numbered bits in the original image data. The printer may then infer that the **absolute zero/invalid portion** value image data corresponds to the even numbered bits in **a second pass** of the printhead; col. 4, lines 35-39), the method further comprising producing the intermediate data by at least one of changing the number (i.e., during a second pass of the printhead, the positions of the "X" and "O" bits are interchanged in fig. 2; col. 5, lines 16-17), changing at least a subset of the associated values (i.e., the four bits of data in slice 1 in fig. 8 correspond to the data

locations represented by "X" bits in fig. 2, after the "X" and "0" bits are interchanged; col. 5, lines 18-20),

Hiraide '078 teaches further compressing the compressed print data (The MISR 7 further compress compressed data from the space compactor 6, col. 9, lines 18-20, fig. 3).

In view of the above, having the combination system of Rosen '871 and Heydinger '940, and then given the well-established teaching of Hiraider '078, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the combination system of Rosen '871 and Heydinger '940 as taught by Hiraider '078, since a such modification would ensure a method of transferring image data from a host computer to such a printer (see Heydinger, col. 1, lines 10-12) and a compressing method called dynamic compaction is generally used in order to decrease a quantity of test data (see Hiraider, col. 9, lines 18-20).

Regarding claim 17, Rosen '871 does not disclose the method, wherein removing provides a first compression, the method further comprising performing a second compression of the compressed print data before sending.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Heydinger '940. In particular, Heydinger '940 teaches the method, wherein removing provides a first compression (i.e., an absolute value of zero for a particular scan of the print-head is not transferred from the host computer to the printer,

thereby decreasing the amount of data transferred to the printer for a particular scan; see col. 2, lines 58-63),

Hiraide '078 teaches the method further comprising performing a second compression of the compressed print data before sending (The MISR 7 further compress compressed data from the space compactor 6, col. 9, lines 18-20, fig. 3).

In view of the above, having the combination system of Rosen '871 and Heydinger '940, and then given the well-established teaching of Hiraider '078, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the combination system of Rosen '871 and Heydinger '940 as taught by Hiraider '078, since a such modification would ensure a method of transferring image data from a host computer to such a printer (see Heydinger, col. 1, lines 10-12) and a compressing method called dynamic compaction is generally used in order to decrease a quantity of test data (see Hiraider, col. 9, lines 18-20).

13. Claims 3, 21-22, 24-25, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heydinger (US 6,124,940) in view of Rosen et al. (US 6,543,871).

Regarding claim 3, Heydinger '940 discloses the method, wherein the output device expands the intermediate data by inserting invalid data elements into the intermediate data (i.e., bits 2, 4, 6 and 8 are used by the printer and expanded out by inserting zero values at bits 1, 3, 5 and 7 such that the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig.

2; col. 4, lines 64-67) that specifies the invalid data elements (plurality of bits indicating that the absolute zero value data/invalid data during a first pass of the printhead corresponds to the odd numbered bits in the original image data, col. 4, lines 30-32).

Heydinger '940 does not explicitly show the method based on a predefined mask

However, the above-mentioned claimed limitation is well known in the art as evidenced by Rosen '871. In particular, Rosen '871 teaches the method based on a predefined mask (four masks, col. 5, line 28, fig. 3a-3d).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Rosen '871, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Rosen '871, since Rosen '871 stated in col. 1, lines 46-47 that such a modification would ensure in generation of masks and in printing with the use of masks.

Regarding claim 21, Heydinger '940 discloses a printing device (Printer, fig. 1) for printing expanded data produced from intermediate data received from a controller (Host Computer, fig. 1), the intermediate data corresponding to print data that is compressed by retaining a first portion (non-absolute zero values/first portion in the image data, col. 4, line 9) of the print data disposed in a first pattern (Pass 1, fig. 7) and removing a second portion of the print data (i.e., an absolute value of zero/second portion for a particular scan of the print-head is not transferred from the host computer to the printer; see col. 2, lines 58-63) disposed in a second pattern (Pass 2, fig. 8) that is

complementary to the first pattern (i.e., the locations of the absolute zero values/second portion and the locations of the non-absolute zero values/first portion are mutually exclusive from each other; see col. 2, lines 49-51), the printing device comprising:

a processor (processor, fig. 1) configured to receive the intermediate data and to expand the intermediate data based on at least one of the first and second patterns (i.e., the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 66-67); and according to the intermediate data after such intermediate data is expanded by the processor (the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2, col. 4, lines 66-67).

Heydinger '940 does not show a colorant delivery mechanism coupled with the processor and configured to deliver colorant to print media.

However, the above-mentioned claimed limitations are well known in the art as evidenced by Rosen '871. In particular, Rosen '871 teaches a colorant delivery mechanism coupled with the processor and configured to deliver colorant to print media (any suitable colorant which is or can be used by a "printer" to form an image on a "page", see col. 5, lines 15-16).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Rosen '871, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Rosen '871, since Rosen '871 stated in col. 1, line 62 that such a modification would ensure sufficient quantities of colorant must be deposited.

Regarding claim 22, Heydinger '940 discloses the printing device, further comprising expansion instructions that instruct the processor in expanding the intermediate data based on the at least one pattern (i.e., Using the information contained within the command byte and bits 2, 4, 6 and 8, the printer inserts zeros corresponding to the absolute zero values in the image data to be printed by the printer. Thus, bits 2, 4, 6 and 8 are used by the printer and expanded out by inserting zero values at bits 1, 3, 5 and 7 such that the four bits of data corresponding to slice 1 in fig. 7 are expanded out to the eight bits of data corresponding to slice 1 in fig. 2; col. 4, lines 60-67).

Regarding claim 24, Heydinger '940 discloses a method of transmitting data to a printing device, comprising:

providing a first array of M X N print data elements (pass 1, fig. 7);

applying to the first array so as to create a second array of M.times.N print data elements (pass 2, fig. 8), the second array including a valid portion and an invalid portion (the host computer is used to define locations of non-absolute zero value/valid portion and absolute zero/invalid portion in the image data, col. 4, lines 3-6);

transmitting the valid portion to a printing device (non-absolute zero/valid portion to image data which has the potential to be printed during a particular pass of the printhead, col. 4, lines 9-11),

wherein the printing device (printer, fig. 1) uses a copy to convert the valid portion(non-absolute zero/valid portion to image data, col. 4, line 9) into a third array of M X N print data elements (figs. 7-8),

wherein the printing device generates printed output according to the third array of print data elements (i.e., bits 3, 6, 9, etc., are transmitted during pass three of the printhead, col. 5, lines 38-39).

Heydinger '940 does not explicitly show applying a predefined mask.

However, the above-mentioned claimed limitation is well known in the art as evidenced by Rosen '871. In particular, Rosen '871 teaches applying a predefined mask (in any suitable form capable of being received and processed by mask generator 120, col. 3, lines 50-51, fig. 1).

In view of the above, having the system of Heydinger '940 and then given the well-established teaching of Rosen '871, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the system of Heydinger '940 as taught by Rosen '871, since Rosen '871 stated in col. 1, lines 46-47 that such a modification would ensure in generation of masks and in printing with the use of masks.

Regarding claim 25, Heydinger '940 disclosed the method, wherein the third array of print data elements (i.e., bits 3, 6, 9, etc., are transmitted during pass three of the printhead, col. 5, lines 38-39) describes a firing pattern for an M X N array of ink

nozzles in the printing device (ink droplets are to be jetted onto the print medium, col. 3, line 45).

Regarding claim 27, Heydinger '940 discloses the method, wherein the valid portion is compressed prior to transmission to the printing device (i.e., only the image data having non-absolute zero values/valid portion is transmitted from the host computer to the printer, thereby decreasing the amount of data transferred to the printer; col. 2, lines 54-63).

14. Claims 26, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heydinger (US 6,124,940) in view of Rosen et al. (US 6,543,871), and further in view of Hirano et al. (US 7,102,791).

Regarding claim 26, the combination of Heydinger '940 and Rosen '871 does not disclose the method, wherein the printing devices retains the copy of the predefined mask in non-volatile memory local to the printing device.

However, the above-mentioned claimed limitation is well known in the art as evidenced by Hirano '791. In particular, Hirano '791 teaches the method, wherein the printing devices retain the copy of the predefined mask in non-volatile memory local to the printing device (i.e., it is possible to store the data of the FM mask into a recording medium of exclusive use, such as a ROM/non-volatile RAM, and to install it in an image

outputting unit concerned as a form of an image-processing module; see col. 11, lines 60-64).

In view of the above, having the combination system of Heydinger '940 and Rosen '871, and then given the well-established teaching of Hirano '791, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the combination system of Heydinger and Rosen as taught by Hirano, since Hirano stated in col. 1, lines 67+ that such a modification would ensure a memory capacity needed would become huge.

Regarding claim 28, the combination of Heydinger '940 and Rosen '871 does not disclose the method, wherein M is equal to N.

However, the above-mentioned claimed limitation is well known in the art as evidenced by Hirano '791. In particular, Hirano '791 teaches, wherein M is equal to N (i.e., a dot pattern of 8 X 8 matrix is assumed as a dot pattern for the FM mask as shown in fig. 10A; col. 9, lines 3-4).

In view of the above, having the combination system of Heydinger '940 and Rosen '871, and then given the well-established teaching of Hirano '791, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to modify the combination system of Heydinger and Rosen as taught by Hirano, since Hirano stated in col. 1, lines 67+ that such a modification would ensure a dither matrix to apply a matrix having a size the same as that of an input original image.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prosi (US 7,110,611) discloses method for the data compression.

Goto et al. (US 2002/0063898) discloses image processing apparatus and method and printing method and apparatus.

Haflinger (US 6,530,645) discloses print masks for high speed ink jet printing.

Mita et al. (US 5,060,280) discloses masking control for image processing systems.

Anzai (US 6,009,242) discloses print controller, printer, data transfer method, and printing condition setting method.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen H. Nguyen whose telephone number is 571-270-1229. The examiner can normally be reached on M-F from 9:00 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Poon can be reached on (571)-272-7440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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~~PRIMARY EXAMINER~~
Supervisory Patent